The contribution of accent distribution to foreign accentedness: causes and implications

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ABSTRACT

English and Egyptian Arabic (EA) display different patterns of pitch accent distribution. The distribution of accents in English can be formalised as phrase-level accent distribution, whereas in EA, accent distribution has been shown to be word-level accent distribution, with an accent occurring routinely on every content word, across a range of contexts and speech styles (Hellmuth 2006). In a production study, we test the hypothesis that the accent distribution pattern of EA will transfer into the L2 English of L1 EA speakers, then, in a perception study, we explore the potential effects of variation in the density of accent distribution on listeners' perceptions of L2-accented speech. The results indicate a mismatch between production and perception in L2 learner behaviour at the suprasegmental level, but apparently in the opposite direction to that observed at the segmental level (Sheldon and Strange 1982): advanced EA L2 learners' of English show evidence of L1 transfer in their production data, but pattern with English listeners in showing an affective interpretation of EA accent distribution.

Keywords: intonation, prosody, foreign-accentedness, production, perception.

1. INTRODUCTION

Egyptian Arabic (EA) displays a very different accent distribution pattern to that found in English. Although in English, in certain contexts, a speaker might realise an utterance with a pitch accent on every word, in most contexts, in naturally occurring speech, speakers realise pitch accents every few words at most. The distribution of accent in English is known to interact with information structure (Gussenhoven 1983, Selkirk 1984) and can be formalised in terms of phrase level accent distribution (Selkirk 2000). In contrast, Egyptian Arabic (EA) displays a default pitch accent on every content word, in a range of speech styles (Rifaat 1991, Hellmuth 2006), and can be formalised in terms of word level accent distribution (Hellmuth 2007). A similar rich accent distribution pattern has been described in other languages including Hindi (Harnsberger 1996, Patil et al. 2008) and Tamil (Keane 2006), and also, crucially, in varieties of English with a 'frequent accent' substrate such as Tamil English (Wiltshire & Harnsberger 2006).

This paper has two aims: i) to test the hypothesis that the rich accent distribution pattern of EA will transfer into the L2 English speech of advanced EA learners of English, and ii), to explore what effects this 'over-accentuation' might have on the interpretation of utterances by both L1 and L2 English listeners. Anecdotal evidence suggests that speakers of 'infrequent accent' languages like English may perceive speakers of 'frequent accent ' languages such as EA to be speaking in an angry or aggressive manner. A possible explanation of this anecdotal evidence is that the different accent distribution patterns in different languages map to a different function: in rich accent distribution languages, the pitch movement serves only to mark word-level prominence (Jun 2005, Hellmuth 2007), so that the mere occurrence of an accent provides no contribution to meaning; this contrasts strongly with the function of accent distribution in English which, as noted above, serves to mark argument/information structure. According to the Effort Code (Gussenhoven 2004:79), increased incidence of pitch movements will be interpreted paralinguistically as emphasis or insistence. If a speaker produces 'unnecessary' extra accents in their L2 English, due to transfer of a linguistic accent distribution pattern from their L1, there is a risk that this will be interpreted paralinguistically instead of linguistically.

We address these twin research questions by means of a production study (in section 2) and a perception study (in section 3).

2. PRODUCTION STUDY: DOES L1 ACCENT DISTRIBUTION TRANSFER TO L2?

Experiment 1 documents accent distribution patterns in the L2 English speech of two female speakers of EA, who recorded IViE corpus stimuli, with comparison to the accent distribution pattern observed in parallel utterances in the speech of two female L1 speakers of Southern British English from the IViE corpus.

2.1. Method

Two female speakers of EA who are advanced L2 learners of English recorded the IViE corpus stimuli (http://www.phon.ox.ac.uk/IViE). We present here an analysis of accent distribution in the read speech sentences and map task only. Both speakers were postgraduate students at the University of York, aged in their early thirties, who were born in Cairo and had lived there continuously until they moved to the UK. They had been in the UK for 15 and 18 months respectively and neither had previously lived in an English-speaking country. Both had studied English at school in Egypt since the age of approximately 4 years and have a level in English of IELTS 6.0 or higher. The speakers differ in that one (FD) attended English medium schools but the other (FR) attended Arabic medium schools. Recordings were made in a soundproof recording studio using B+K 4001 condenser microphones directly to digital format at 16bit 44.1Khz. The sound files were resampled to 16 bit 22.05KHz prior to analysis to reduce processing time in Praat.

For comparison, two female speakers from Cambridge were selected from the IViE corpus (speakers f1 and f3) and their read speech sentences and map task dialogue were analysed in directly parallel fashion to the L2 speakers' data. For the L2 speech data, prosodic transcriptions were made using IViE notation by the author and by a second trained transcriber and the final transcription of the data relied on both transcribers' annotations (intertranscriber agreement was approximately 84%). For the L1 speakers' data the author transcribed the data in parallel fashion then made comparison with published IViE transcriptions to arrive at a final transcription (agreement with the published data was approximately 86%). Since the dependent variable of interest in the present study is accent density, if the two input transcriptions differed over presence/absence of an accent, the transcription without an accent was maintained, so that the accent count represents the most conservative analysis of the data.

The number of function words and content words was counted in each portion of the data: the 44 read speech sentences comprise 444 words in total (260 function words, 184 content words); the L2 speakers' map task dialogue contained 333 words (158 function words, 175 content words); the L1 speakers' map task dialogue contained 371 words (162 function words, 207 content words). Finally, the proportion of words realised with a pitch accent, by L1 and L2 speakers respectively, was calculated.

2.2. Results

The results of the transcription study are shown in Figure 1 below. We observe a higher incidence of accents in the EA speakers' L2 English than in that of the two L1 speakers. The difference in accent density between L2 and L1 speakers is somewhat more pronounced in the map task dataset than in the read speech dataset. The difference in mean values of accent density between the two groups is significant for content words, in both datasets (read speech: $t=3.484$; $df= 75.9$; $p=0.001$; map task: $t=4.905$; $df=79.4$; $p<0.001$), but not for function words (read speech: $t=0.994$; $df= 86$; $p=0.323$; map task: $t=0.692$; $df=84$; $p= 0.491$). A pair of sample read speech utterances, illustrating the denser distribution of accents in L2 speech than in L1 speech, is provided in Figures 2 and 3 below (which also illustrate the transcription labelling scheme).

2.3. Summary

The production study results suggest that the accent distribution pattern observed in EA, whereby a pitch accent is realised on every content word, does transfer into the speech of even advanced L2 EA learners of English. In section 3 below we explore whether this transfer creates potential for misinterpretation of EA speakers' L2 English.

Figure 1: Percentage of words realised with an accent, by word type and by speaker group (L1 vs. L2), in read speech sentences (left) and in map task dialogues (right).

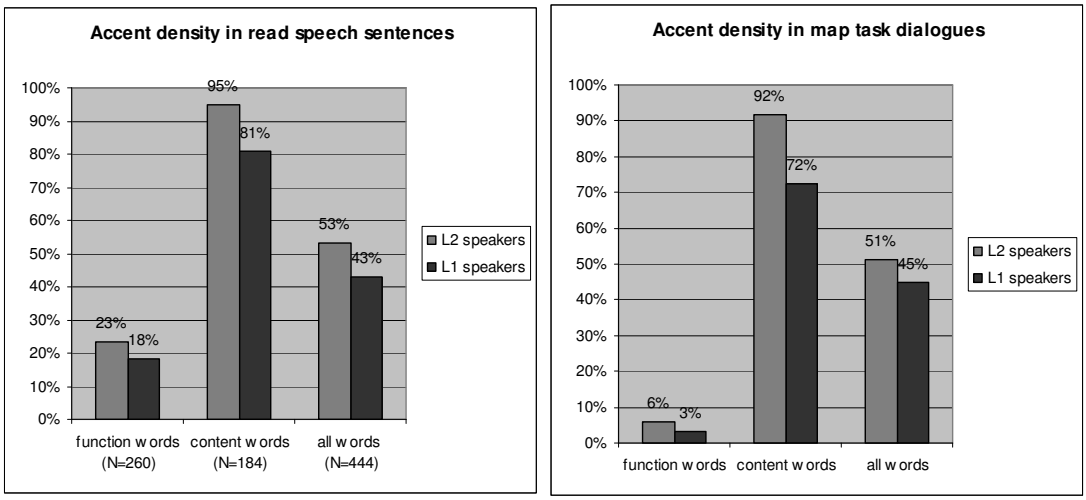


Figure 2: Sample pitch trace showing accentuation of all content words in a yes-no question by an L2 speaker (speaker FD).

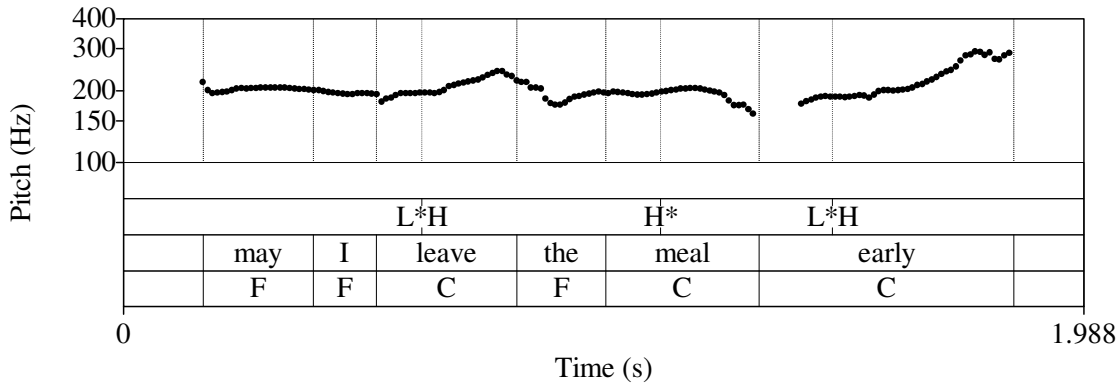
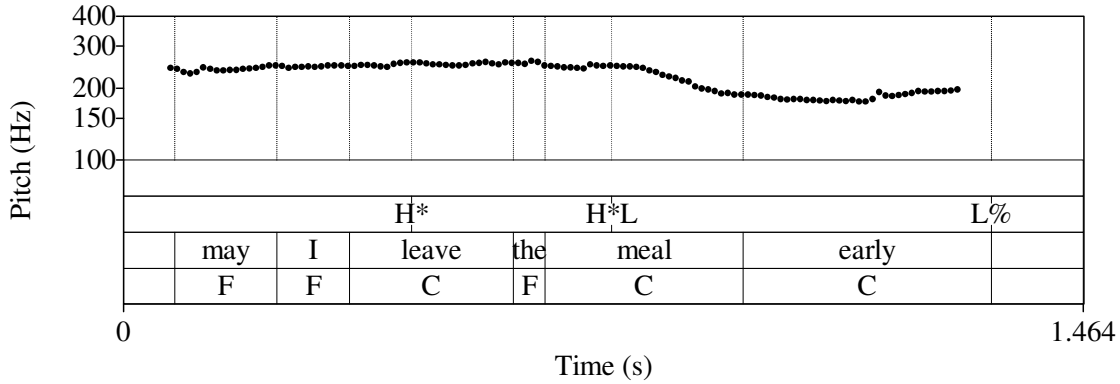


Figure 3: Sample pitch trace showing realisation of a yes-no question by an L1 speaker from the IViE corpus (speaker f1).



3. PERCEPTION STUDY: DOES L1 TRANSFER OF ACCENT DISTRIBUTION MATTER?

Experiment 2 explores how increased density of accent distribution, in EA and in English, is interpreted by listeners. As set out in section 1 above, anecdotal evidence suggests that speakers of phrase-level accent distribution languages, like English, may perceive speakers of word-level accent distribution languages, such as EA, to be speaking in an angry or aggressive manner. Gussenhoven (2004:71ff.) proposes a set of biological codes which influence both linguistic and paralinguistic interpretation of tonal events: the Frequency Code affects overall pitch range such that higher pitch is interpreted as being produced by a smaller speaker, and the Production Code affects declination, such that high pitch will be interpreted as utterance-initial, and low pitch as utterance-final. The Code that is relevant for our present purposes is the Effort Code which affects f0 excursion and what Gussenhoven terms the "incidence of movements" (p79). According to Gussenhoven, greater effort will result in either greater f0 excursion or more pitch movements. The informational interpretation (signalling some attribute of the message itself), of either of these instantiations, will be as more or less 'emphatic', whilst the affective interpretation (signalling some attribute of the speaker) will be 'insistent' or 'surprised'.

Since both English and Arabic use f0 excursion to signal focus (e.g. Ladd & Morton 1997, Hellmuth 2006) we expect that the two sets of listeners will give similar 'emphasis' ratings to utterances with differing accent density (in both English and EA). In contrast, for 'insistence', our hypothesis is that ratings will vary across the two sets of listeners: we expect density of accent distribution to have no affective value for EA listeners, since every content word is routinely accented in EA, whereas we expect English listeners to perceive utterances with a greater incidence of pitch accents as more insistent.

3.1. Method

We manipulated the incidence of pitch movements in two sample utterances, in EA and English, and they were rated separately for degree of emphasis and degree of insistence by 4 English listeners and 4 EA listeners (with advanced L2 English). The two target sentences were in each case the opening sentence in a read narrative: the Cindarella story from the IViE corpus and recordings of "Guha and the banana seller" (Abdel Massih 1975) from Hellmuth 2006. The incidence of pitch movements in each utterance was systematically varied by manipulating the f0 contour to increase or decrease the number of accents, as required, using the PSOLA resynthesis function in Praat.

For the EA stimuli, the base stimulus contained 10 content words and was realised with 10 pitch accents; the number of accents was systematically reduced in five additional steps (10 > 8, 7, 6, 4, 3). For the English stimuli, the base stimulus also contained 10 content words, but was realised in the original with 6 pitch accents; the number of accents was increased/decreased in five additional steps (10, 8, 7 < 6 > 4, 3). In each language the range was from 10 to 3 pitch accents per utterance. The base stimulus and a sample manipulated accent distribution contour for each language are illustrated in Figures 4-5 below. Four L1 English listeners and four L1 EA listeners rated each of the six stimuli in each language twice each on two scales: firstly, 'emphatic↔non-emphatic', then, in a separate task, on the scale 'insistent↔non-insistent'.

3.2. Results

The results of the ratings for degree of emphasis and degree of insistence, from English and EA listeners are shown in Figure 6 below. For 'emphasis', as predicted, there was no apparent effect of accent density on ratings, neither for English not EA listeners; there is however an overall effect of stimulus language, in that both sets of listeners rate utterances not in their own language as more emphatic than those in their own language, and the difference is greater for the Arabic listeners. For 'insistence', a similar effect of language is found (listeners rate utterances in their own language as less insistent than those not in their own language) but as predicted, there is an effect of accent density on the degree of 'insistence' perceived: English listeners interpret increased accent density in Arabic utterances as more insistent (and there is a similar though weaker effect for English utterances). Contrary to expectations however, the EA listeners show a similar trend, rating Arabic utterances as more insistent when they contain a greater number of accents.

Figure 4: Pitch trace showing English base stimulus (EN4, black) with fully accented stimulus (EN1, grey) for comparison.

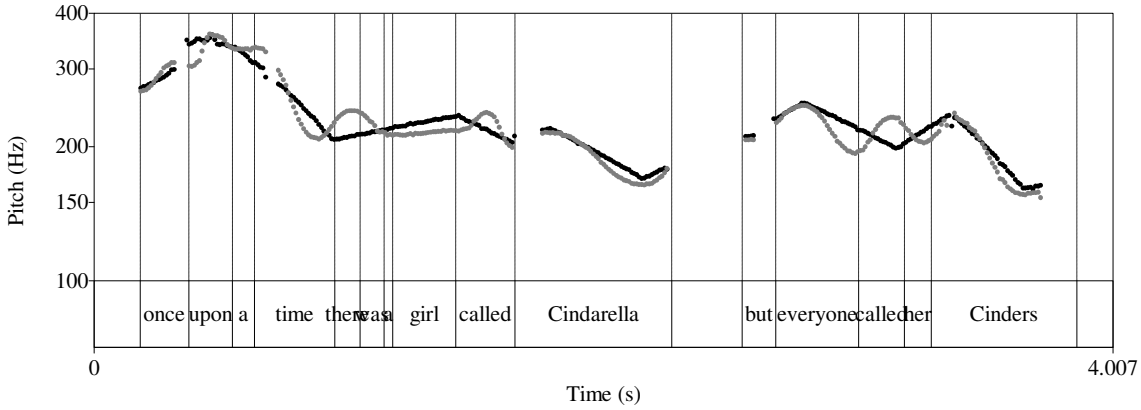


Figure 5: Pitch trace showing EA base stimulus (EG1, black) with de-accented stimulus (EG6, grey) for comparison.

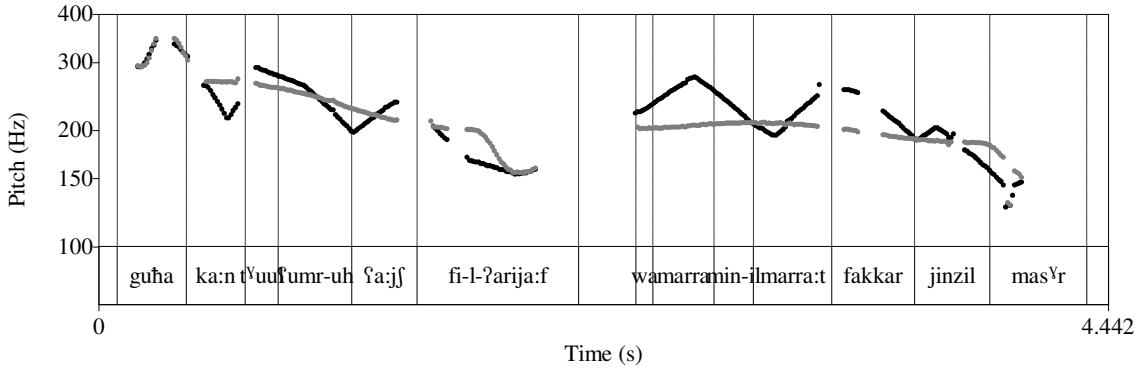
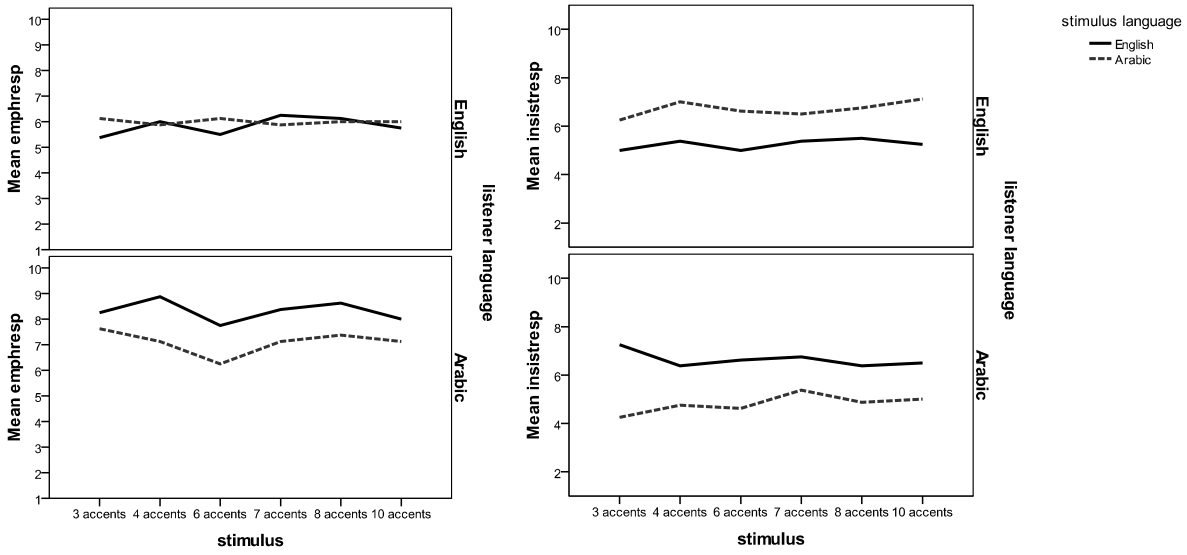


Figure 6: English and EA listeners' ratings for emphasis (left) and insistence (right) of English (solid)/EA (dotted) stimuli.



3.3. Summary

As predicted, the informational value of accent distribution, as emphasis, is similar for both English and EA listeners, which we ascribe to use of increased f0 excursion (an alternative instantiation of the Effort Code) in both languages for marking of contrastive focus. The affective value of accent distribution varies however, such that English listeners interpret utterances with a greater number of accents as more insistent than parallel utterances with fewer accents. Contrary to expectations, the EA listeners responded similarly, also rating greater accent distribution in EA utterances as more insistent. Since all our EA listeners were advanced learners of L2 English, resident in the UK, we interpret this as evidence that L2 learners may develop an awareness of the basic difference in accent distribution in the two languages, and an affective interpretation of accent density becomes available to them.

4. CONCLUSION

Prior research has established that accent distribution is a parameter of cross-linguistic prosodic variation (Hellmuth 2007) and is thus expected to be a candidate for potential L1 transfer effects into L2 learners' interlanguage. We have demonstrated here that accent distribution does transfer into the L2 English of advanced EA learners of English, and in addition have shown that density of accent distribution may be interpreted affectively by English listeners as increased insistence, due to differences in the instantiations of the Effort Code between EA and English. Nonetheless, we find that although L2 learners produce a greater density of accents, they appear to be aware in perception that dense accents are not English-sounding (and rate them as insistent). A limitation of the perception study is that the stimuli were manipulated in only one acoustic correlate of prominence (f0) so that listeners may be picking up on other correlates which remained unchanged (duration, intensity, vowel quality and articulatory force). In future work we hope to examine the effects on both affective and informational interpretation of variation in metrical prominence (marked by non-tonal and tonal cues) and accent distribution per se (marked by tonal cues only).

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